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The Influence of Expenditures in Football Industry Results: Case Study of the Brazilian Football League

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Abstract: Reserarch question: The paper investigates the influence of football clubs investments on their performance in the first division of the Brazilian league. **Motivation:** Given that football is the most important sport in Brazil, representing a cultural symbol of the country, a better understanding of it becomes necessary. Therefore, it is necessary to investigate the financial amounts involved in the management actions to try to understand the influence of the investments that the clubs put into marketing and championships improvement and, consequently, to be able to delineate the relation between investment and success in football. **Idea:** In this perspective, the central hypothesis of this study is that the clubs that present the highest expenditures on soccer will also present the best classifications, since these expenses are related to better training conditions and salaries, which may contribute to the recruitment of the best athletes. **Data:** The study was conducted using the data collected over the Internet, the data disclosed by clubs. Only the clubs belonging to the first division were used, a total of 19 clubs, divided into 3 groups, according to the investment value in football. **Tools:** This study presents descriptive and inferential analyzes, since the qualitative-quantitative approach was assumed as a way of understanding the data. Assuming the number of clubs participating in the study, we chose non-parametric inferential analyzes in the intra- and inter-group evaluations, using the alpha value of 0.05 as a criterion. **Findings:** The results showed that clubs in groups G1 and G2 had similar expenditure dynamics, while G3 group clubs had a slight swing. In addition, clubs in groups G1 and G2 had the largest amounts of expenditures, while G3 clubs had the lowest expenditure during the period analyzed. These results demonstrated that the clubs of the G1 and G2 groups achieved the best positions in the championships, corroborating the research hypothesis. **Contribution:** One can conclude that the investment of the clubs directly influences the classification in the championships, large investments obviously being necessary to conquer the championship. However, this study has some limitations, such as sample size (19 teams only). Therefore, we emphasize the need for new studies.

Key Words: Football, Brazilian football league,Football Clubs, Classification of clubs, Sports administration.

JEL Classification: Z23

1. Introduction

Football clubs are seen as a kind of business that needs not only reach victories, but also have a good financial development (Guzman, 2006). Even though the sporting success is more relevant than the economic situation, the relation between both terms is evident (Haas, Kocher, & Slitter, 2004). According to Haas (2003), a club just survives if it triumphs in looking for good economical results, which might be improved because of the results obtained (titles, TV rights, tickets, among others).

This need of investments also highlights the involvement of external collection agents (companies) that allow clubs to make improvements, such as investments in new hires or better salaries (Nascimento, Nossa,

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Bernardes, & Sousa, 2015), in addition to exercising a social function while generating jobs and entertainment. These companies are releated of services (food, transportation and marketing, for example), industry (shirts, sport articles, bands, among others) and entertainment (games broadcasting, computer games, debating programmes, and so forth) (Nascimento et al., 2015).

As regards these incoming possibilities, Soriano (2013) says that with the structure improvement, the income generated by the stadiums rises, with good prices and discrimination by offering popular and luxury options. This author highlights the existence of other incoming sources, since the clubs own TV channels today and can extend the TV broadcast by radio, the Internet, mobile phones and also through the marketing, merchandising, stadium tours and friendly games. This reality expands the scenario from 1980's, for example, when the income used to be obtained only from the supporters. Also, only in the 1990's the private TV networks came to fight for the broadcasting match rights, which initiated a possibility for the clubs to sign contracts with more players and to pay higher salaries to their respective squads.

Marketing is also one of these income sources of the clubs, since their exhibition might increase their profits chances (Soriano, 2013). On this line, the marketing and the club exhibition is, in majority, conditioned by the players renown, which demonstrates that only clubs with famous players might take advantage of their highest potential of marketing and exhibition effects (Pavlovic, Ljumovic, & Knezevic, 2014). In this perspective, it is understood that, in football, the richest clubs may use their income in a better way to hire the best players and, this way, generate the highest commercial returns and success in this sport (Pavlovic, Milacic, & Ljumovic, 2014).

Thereby, Anderson & Sally (2013) reinforce that rich clubs invest their capital in essential technologies and in clubs for their best performance against the opponents. According to the same authors, rich a sporting club invests more in its football club, provision of better equipment and, with those, structures the training sessions in the best way possible, besides giving support to a good condition, an adequate rehabilitation, etc.

Hence, the justification for this manuscript is based on the fact that football clubs represent a kind of business that aims to achieve success and good economical balance (Guzman, 2006). However, to achieve success and the financial balance as well, the club needs strategic investments in order to make itself interesting to the investors (Anderson & Sally, 2013).

Considering that football is one of the main Brazilian symbols (Santos & Greuel, 2010), studying this cultural manifestation makes itself necessary. Besides, studies about football must take into account the financial amounts involved in management actions (Nascimento et al., 2015), since the literature points to the clubs' capital influence on their marketing actions and their investment management to improve the image and sports success (Anderson & Sally, 2013; Haas et al., 2004; Pavlovic, Ljumovic, et al., 2014; Pavlovic, Mijatovic, & Milacic, 2013; Pavlovic, Milacic, et al., 2014).

Following what has been said so far, the objective of this manuscript is to investigate the influence of the general expenditures of the football clubs (such as salaries, debts, taxes, among others) on final results of the clubs from season 2011 to season 2016 in the first division of the Brazilian football league (Série A).

2. Methodology

To meet the objective of this study, the research method "explanatory documentary research" was used. This method aims to identify, register, analyze and interpret observable facts and their possible causes (Lakatos & Marconi, 2011).

The data about football expenditures presented in this study were obtained from the Internet, from the clubs league table positions in the Brazilian league. The websites visited to get these information were:Lance (Somoggi, 2017a, 2017b), Slide Share (Somoggi, 2017c) and ESPN (2016). It is highlighted that "Lance" and "ESPN" are internationally recognized websites and the author Amir Somoggi has investigated the Brazilian clubs finances for more than a decade, being a researcher recognized nationally and internationally. All information obtained and analyzed is available on the above sites.

To relate the expenditures of football and the performance in the first division of the national league, the data about the positions were obtained from the league table of the clubs between 2011 and 2016. This information was found in the Brazilian Football Confederation (Confederação Brasileira de Futebol – CBF), the institution responsible for football in Brazil (http://www.cbf.com.br/competicoes/).

It should be noted that the first division of the national league consists of 20 clubs, thus, this is one of the limitations to enlarging the list of participating clubs in the present study. In addition, regarding the choice of clubs, the final classification in 2016 was taken into account, that is, only clubs that were in the first division of the national league participated in the present study, even if in other years they were in the second division of the national league. In this way, the information on expenditures used refers to clubs that were in the first league in 2016. All expenditure values were obtained from the aforementioned sites.

After collecting all the data from those websites, the total of clubs used was 19 since 1 of them presented missing data, which threatened to compromise the analysis of the results. The clubs were divided into 3 groups, according to the total expenditures (in millions dollars, with some cases involving trillions dollars) that are disclosed between 2011 and 2016 (Table 1). The expenditures that the paper deals with are all the expenses that the club has concerning its football section, such as salaries, equipment, travel and lodgings for sportsmen.

So, the 19 clubes of football were divided into 3 groups according to the total expenditures in football (values of player salaries, staff, transfers, image rights, etc.) between 2011 and 2016. In this article the expenditures are interpreted as the cost the club had in the observed period of time. So, the values allowed the delimitation of three groups of investigation: G1 with 5 clubs, G2 with 6 clubs and G3 with 8 clubs. The groups formation criteria were:

- Group 1 (G1): Teams that spend more than 320 million dollars;
- Group 2 (G2): Teams that spend between 190and 310 million dollars;
- Group 3 (G3): Teams that spend less than 189 million dollars.

Table 1: Annual expenditures of each football club (n = 19)

Group	Club	Expenditure in 2016 in millions of US$	Expenditure in 2015 in millions of US$	Expenditure in 2014 in millions of US$	Expenditure in 2013 in millions of US$	Expenditure in 2012 in millions of US$	Expenditure in 2011 in millions of US$	Total Expenditures
G1	Corinthians	94.6	79.0	75.3	78.3	73.6	62.3	463.2
	Palmeiras	92.3	77.7	63.9	42.2	44.1	36.6	356.8
	São Paulo	83.7	86.4	74.3	78.3	59.8	46.1	428.6
	Cruzeiro	61.0	96.7	61.1	49.7	31.3	28.0	327.8
	Internacional	55.4	67.9	61.0	66.7	60.7	46.6	358.3
Total		386,9	407.6	335.6	315.3	269.7	219.5	1934.6*
Average		77,4	81.5	67.1	63.1	53.9	43.9	386.9**
Standard Deviation		16,2	9.6	6.4	14.8	14.7	11.5	50.5***
G2	Atlético-MG	73.7	52.6	59.8	46.2	39.7	28.8	300.9
	Flamengo	63.4	46.4	53.6	56.8	0.0	34.3	254.5
	Grêmio	60.0	55.1	48.6	49.3	42.4	30.4	285.9
	Fluminense	57.1	38.5	25.7	25.9	24.1	20.3	191.5
	Santos	55.4	54.6	51.8	52.9	42.6	44.9	302.2
	Botafogo	31.7	24.1	38.3	52.9	31.0	18.8	196.8
Total		341,4	271.3	277.8	284.1	179.8	177.5	1531.9*
Average		56,9	45.2	46.3	47.3	36.0	29.6	255.3**
Standard Deviation		12,7	11.1	11.3	10.1	7.3	8.8	46.0***
G3	Bahia	20.2	15.1	19.8	19.0	17.0	12.3	103.4
	Coritiba	19.5	17.3	22.5	20.7	19.5	15.9	115,4
	Vitória	18.8	13.5	14.7	15.1	12.9	7.4	82,4
	Sport	18.5	18.4	16.1	14.4	14.5	11.8	93,6
	Figueirense	17.5	10.9	11.9	10.0	11.8	11.3	73,4
	Goiás	15.8	10.0	9.2	13.3	11.3	8.5	68,1
	Vasco	38.3	32.3	24.5	35.9	29.8	24.8	185,5
	Atlético-PR	33.5	33.9	25.9	28.4	22.5	17.6	161,8
Total		182,1	151.3	144.6	156.8	139.4	109.5	883.6
Average		22,8	18.9	18.1	19.6	17.4	13.7	110.5**
Standard Deviation		7,8	8.6	5.7	8.1	5.9	5.3	39.7***

Source: Brazilian Football Confederation

*In millions of dollars (US currency). **Expenditure averageto the period 2011-2016.

***Standard deviation of the expenditure in the period 2011-2016.

3. Analysis procedures

This study presents descriptive and inferential analysis because it assumes the qualitative-quantitative approach as the way of understanding the data and, with this, pursues the study's objective that involves investigating the influence of the expenditures of the football clubs on final results of the clubs from season 2011 to season 2016 of the first division of the Brazilian football league (Série A). The descriptive statistics is not sufficient to give significance to the findings, given that it does not have the "power" of comparison that mathematics has and, therefore, cannot give significance to its findings, as accurately as inferential statistics can. Thus, it is necessary to use inferential statistics, since it can demonstrate if there is a significant difference and, consequently, a causal difference ($p < 0.05$) and not a chance difference.

According to the theory of the central boundary, the bigger the sample, the closer a normal distribution of the averages will be. Green, Salkind and Akey (2000) suggest that in a group with more than 30 participants, it is possible to assume normality and homogeneity of variance without the use of tests. Since the number of participants in this study was less than 30, there was a need to test the normality and the homogeneity of the variance. The normalitywas tested using the Kolmogorov-Smirnov (K-S) and to test the homogeneity of variance, the Levene test was used (Field, 2009).

In relation to the normality, the K-S test demonstrated $p<0.05$, in other words, there is no normality in the investigated variables. In case of the homogeneity of the variance, Levene test showed $p<0.05$ demonstrating no variance homogeneity. Adding to this, Torman, Coster and Riboldi (2012) recommend, for small samples, the use of non-parametric tests for analysis, where testing variance normality and homogeneity is not necessary.

Through the results and literature suggestions (Field, 2009; Thomas, Nelson, & Silverman, 2012; Torman et al., 2012), the non-parametric tests were used to analyze the data and the alpha value of 0.05 was used for significant differences. In the between groups analysis, the Kruskal-Wallis test was used. In intragroup analysis, Friedman and Pearson Correlation were used. When significant differences between groups were found, the post hoc U of Mann-Whitney was used. In case of significant intragroup differences, the post hoc Wilcoxon was conducted (Field, 2009).To fail's control type 1, the sequential procedure of Holm de Bonferroni (Green et al., 2000) was applied. All analyses were made with the use of the IBM SPSS Statistics, version 20.

4. Results

It must be understood that in this case study, the results of the analysis apply only to the clubs and context involved, thus limiting its power of generalization. Firstly, the expenditure (cost) of the football clubs groups were analyzed, verifying if there were differences among the groups. In this analysis, when some significant difference was found, the alpha value (0.05) was divided by the number of comparisons made to find the difference (Green et al., 2000).

In a qualitative analysis, it was seen that the G1 had the highest amount of expenditure over the whole period (2011 to 2016) and that the G3 group had the lowest expenditure value among the football clubs. Those findings were supported by the inferential analysis, conduced with the Kruskal-Wallis, since significant differences where found between groups and among all the years ($p<0.05$) according to Table 2. In locating of the difference, the U test of Mann-Whitney was used. A Bonferroni correlation was applied to control the fail type 1 and all effects were tested on the significance level of 0.0167 (p value adjusted because 0.05 was divided by the number of comparisons, which was 3 in this case).

The results demonstrated that the difference between groups G1 and G2 in seasons 2015 and 2014 is ($p<0.0167$), between groups G1 and G3 over all the years is ($p<0.0167$) and between groups G2 and G3 in the entire period is ($p<0.0167$). Those results suggest that the G3 group was the one with a smaller amount of expenditure made by the football clubs, that expenditures made by the football clubs in groups G1 and G2 were effected in a similar way, except in 2015 and 2014, when clubs in the G1 group spent more than clubs in the G2 group, that is, there was no difference in expenditure on football between groups G1 and G2. Thus, the results showed that the 2 groups presented similar expenses, with the exception of the 2015 e 2014, corroborating the qualitative analysis.

Table 2: Comparison of the football club groups expenditure determined by using Kruskal-Wallis test. (Groups = 3, n = 19).

	Expenditure 2016 In millions of US$	Expenditure 2015 In millions of US$	Expenditure 2014 In millions of US$	Expenditure 2013 In millions of US$	Expenditure 2012 In millions of US$	Expenditure 2011 In millions of US$
Qui-Square	13.075	14.958	15.372	12.774	13.411	13.405
Degrees of Freedom	2	2	2	2	2	2
Asymptotic Significance	0.001	0.001	0.000	0.002	0.001	0.001
Exact Significance	0.000	0.000	0.000	0.000	0.000	0.000

Source: Authors' calculations.

Concerning the expenditure (costs) evolution by the football clubs, an intragroup analysis was conducted with the Friedman test. From a qualitative analysis, it can be seen that the G1 group showed values rising until 2015, with a drop in the expenditures in 2016 (Table 1). These results were confirmed since the Friedman test showed significant differences in the G1 group (x^2 (5) = 18.829; $p < 0.002$).

As regards the location of the difference, the Wilcoxon test with the sequential procedure Holm de Bonferroni was not able to identify the differences among the observed years when the adjusted alpha value was used ($p \leq 0.0033$). However, when it was analyzed by the points of higher and lower values (Friedman), it was seen that the difference lies between the initial years (2011 and 2012) and the last ones (2015 and 2016). These results indicate that there was a significant increase in the amount of expenditures from 2011 to 2016, demonstrating that clubs spent more money each year.

In the G2 group, the same expenditure evolution dynamics as in the G1 group can be observed. In other words, they increased the amount of expenditures until 2013, but in 2014 and in 2015 they reduced it, and increased it once more in 2016 (Table 1). This information was confirmed since the Friedman test showed significant differences in the G2 group (x^2 (5) = 23.048; $p < 0.001$).

Concerning the location of the difference, the Wilcoxon test with the sequential procedure of Holm de Bonferroni was not able to identify the differences among the years, when the adjusted alpha value ($p \leq 0.0033$) was used. However, analyzing the highest and lowest values of the Friedman test, it was seen that the difference is between the initial years (2011 and 2012) and the other ones (2013 to 2016). These results indicate a dynamics of expenditures by the football clubs similar to those of the G1 group.

As regards the G3 group, and using qualitative analysis, it can be seen that the amount of expenditures paid by the football clubs increased until 2013, dropping in 2014 to rise once more in 2015 and in 2016 (Table 1). This information was confirmed because the Friedman test showed significant differences for the G3 group (x^2 (5) = 21.264; $p < 0.001$).

In relation to the location of the difference, the Wilcoxon test with the sequential procedure of Holm de Bonferroni was not able to identify differences among the years, when the adjusted alpha value ($p \leq 0.0033$) was used. However, when analyzed by the highest and lowest values (Friedman), the difference is found among the initial year (2011), from 2012 to 2016 and between 2015 and 2016. These results indicate that the year in which clubs had smaller expenditures was 2011, but there was a significant increase in football club expenditures in 2012 and then in 2016.

In summary, the above results demonstrated that all groups increased their football club expenditures and that groups G1 and G2 showed similar dynamics of expenditure rise. Moreover, the inferential analysis did not demonstrate significant differences between groups G1 and G2. Added to this, the G3 group was the group with the lowest amount of football club expenditures, being significantly inferior to the other groups. Lastly, the results showed that, over the years, all clubs increased their football club expenditures, perhaps trying to achieve the highest possible positions in the league table. However, some planetary famous football clubs sometimes can invest significantly, even if they are already first-placed on the table, in order to increase commercial and marketing revenues. (see more: Pavlovic, Ljumovic, Knezevic, 2014).

Thus, with the intention of investigating the influence of expenditure on league table positions in Serie A, the groups were also analyzed as regards their final positions in the league (categories). For this, the groups remained the same and the clubs were divided into sub-divisions within the group (categories). At this stage

of the analysis, the criteria used were: The Top-4 was considered as "Elite"; clubs between 5º and 10º were classified as "Continental Competition"; between 11º and 16º were classified as "Neutral"; lastly, from 17º to 20º the clubs belonged to "Relegation + Serie B (second division)", according to Table 3. In summary, in these analyzes, the clubs were reorganized into sub-categories within the groups, which corresponded to their final classification in the year evaluated.

Table3: Categories of the analysed groups (G1, G2 and G3) in the Brazilian Football League (Serie A) (n=19).

Group	Categories	League Table Position Série A 2016 in %	League Table Position Série A 2015 in %	League Table Position Série A 2014 in %	League Table Position Série A 2013 in %	League Table Position Série A 2012 in %	League Table Position Série A 2011 in %	Average
G1	Elite	20.00	40.00	80.00	20.00	20.00	20.00	33.33
	Continental Competition	40.00	60.00	0.00	40.00	60.00	40.00	**40.00***
	Neutral	20.00	0.00	20.00	20.00	0.00	40.00	16.67
	Relegation+ Série B	20.00	0.00	0.00	20.00	20.00	0.00	10.00
G2	Elite	50.00	33.33	0.00	33.33	50.00	33.33	33.33
	Continental Competition	33.33	16.67	83.33	33.33	33.33	33.33	**38.89***
	Neutral	16.67	33.33	0.00	33.33	16.67	33.33	22.22
	Relegation+ Série B	0.00	16.67	16.67	0.00	0.00	0.00	5.56
G3	Elite	0.00	0.00	0.00	12.50	0.00	12.50	4.17
	Continental Competition	12.50	25.00	12.50	25.00	12.50	25.00	18.75
	Neutral	37.50	25.00	50.00	25.00	25.00	12.50	29.17
	Relegation+ Série B	50.00	50.00	37.50	37.50	62.50	50.00	**47.92***

Source: Brazilian Football Confederation
*Category of higher occupation to each group.

In Table 3, it can be seen that the G1 group had the majority of its teams inside the "Continental Competition" group, from 2011 to 2016, presenting, on average, 40% of its clubs in this category. Added to this, the G1 group always presented teams in the "Elite" category, having, in 2014, 80% of its clubs in this category. When these 2 categories are added, the G1 group has 73,33% of its teams in "Elite" or in the "Continental Competition". These results demonstrate that the G1 clubs had high expenses to maintain their classifications in the evaluated championships, which was justified by their placement in the evaluated championships, since they were in most cases between the elite categories and the intercontinental championship.

In relation to the G2 group, clubs were positioned, in majority, within the "Continental Competition" category (38.89%) as in the G1 group. Moreover, a large number of these teams were also present in the "Elite" category (33.33% of clubs). When both categories are added, the G2 group is present in 72.22% of the occasions. Different from the G1 group, the G2 group had a lower percentage of relegated teams (33.33%). Relegation, with the evolution of league table's positions as well, might justify the expenditure evolution by the football clubs in this group.

As regards the G3 group, as expected for the group being one with the lowest football club expenditures, 47.92% of its clubs, on average, it finished the league in "Relegation + Série B" category. Added to this, the G3 group had 77.08% of its clubs in the last two categories (Neutral and Relegation + Série B), which can also justify the increase in football club expenditures.

Proceeding with the analysis, the variables on league positions were transformed, using the following rule: "Elite" teams received punctuation 4, "Continental Competition" ones received 3, "Neutral" teams had punctuation 2 and "Relegation + Série B" teams received 1.

To verify if there was a significant difference among groups concerning clubs evolution, considering the league position, the Kruskal-Wallis test was conducted. The qualitative analysis mentioned above was partially supported by the test (Table 4), since in 2011 and in 2013 there was no significant difference among groups.

Table 4: Results of Kruskal-Wallis test to between groups comparisons concerning teams league position (groups = 3, n = 19).

	League Position 2016	League Position 2015	League Position 2014	League Position 2013	League Position 2012	League Position 2011
Qui-Square	8.116	6.906	9.396	2.213	9.113	3.166
Degrees of Freedom	2	2	2	2	2	2
Asymptotic Significance	0.017	0.032	0.009	0.331	0.010	0.205
Exact Significance	0.012	0.026	0.004	0.342	0.005	0.214

Source: Authors' calculations

In relation to the location of the difference, a U test of Mann-Whitney was used. A correlation of Bonferroni was applied to control fail type 1 and all effects were tested on significance level 0.0167 (adjusted p value since 0.05 was divided by the number of comparisons, 3 in this case).

The results demonstrated no significant difference between groups G1 and G2, but there was a difference between groups G1 and G3 in 2014 and 2015 ($p<0,0167$) and between groups G2 and G3 in 2016, 2014 and 2012 ($p<0.0167$). These results suggest that groups G1 and G2 present similar dynamics of league positions, besides having no significant differences in expenditures. Moreover, the G3 group presented the lowest league positions in 2012, 2014, 2015 and 2016 when compared with the other 2 groups. In 66.66% of the tournaments, the G3 was the least successful group.

These results may be explained by the findings about the expenditures of the clubs. In other words, clubs that spent more obtained the best league positions, while the ones that spent less, finished at the bottom of the league table. However, this information is only an explicative hypothesis. Aiming to verify the intragroup evolution, inferential analysis was made, conducted by the Friedman test, which did not present significant differences in the G2 group over all the years (x^2 (5) = 8.733; $p > 0.120$). In other words, clubs in the G1 group, even by increasing the amount of their football club expenditures, did not improve their league positions, remaining, in majority, in the "Continental Competition" category (G1 group had an average of 3.02 in the categories). However, it was already expected, since the G1 group was always in the best league positions, dropping the chance of increase.

As regards the G2 group, the same analysis was conducted and, as in case of the G1 group, there were no significant differences among the observed years (x^2 (5) = 2.909; $p > 0.714$). the G2 group, even by increasing the amount of football club expenditures, did not improve the league positions, its clubs remaining, in majority, in the "Continental Competition" category as is the case with the G1 group (G2 group had an average of 3.00 in the categories).

Concerning the G3 group, the inferential test did not show significant differences among the analyzed years (x^2 (5) = 2.899; $p > 0.716$). Even increasing the football club expenditures, clubs in the G3 group could not improve their league positions, always remaining in the lower positions and, in all years, with one or more teams in the second division of the Brazilian league (the G3 group had an average of 1.74 in the categories).

In order to correlate both variables (football club expenditures and league position), the Pearson correlation was used. In this step, the values of $R > 0.700$ (positive or negative) were considered to accept the correlation. The values used in this step were transformed in the previous analysis (Table 4). Correlation analysis was conducted at the same year (ex. Expenditure 2016 x League Position 2016), aiming to test the hypothesis that football club expenditure is related to the club's league positions.

The G1 group, the one that obtained 3.03 on average in the categories, in the Pearson correlation the results demonstrated strong correlations between expenditures and league position in 2016 ($r = 0.911$, $p<0.031$). It happened also in 2011 ($r = 0.971$, $p<0.006$). However, results can be seen in a different way; by having a correlation in only 2 years, it is not possible to claim that there is, for this group, a correlation between football club expenditures and the highest league positions.

Hence these correlations corroborate, partially, with the hypothesis that clubs with highest football club expenditures occupy the highest league positions, since Pearson test only showed a strong correlation in only 2 years. However, the G1 was the group that was found in the "Elite" and "Continental Competition" groups more frequently (73.33%), indicating that teams with highest expenditures can take the best positions.

Concerning the G2 group, results did not demonstrate a correlation between expenditures and the league position, with an exception in 2015 ($r = 0.886$, $p < 0.019$). Those data suggest that the G2 group oscillated with frequency in the league positions, independent of the costs, but remaining in the "Elite" and "Continental Competition" categories (72.22%). Even by expenditure more, the football clubs from this group could not achieve better league positions, thus corroborating the intragroup analysis about league positions and correlation analysis of the G1 group. However, the lack of improvement was also expected, since once as the G1 group, they occupied the highest league positions and, added to this, the G2 group represented the group with a smaller number of teams relegated (33.33%).

Lastly, the G3 group did not present strong correlation between expenditures and league position. Those findings, while not having correlations to confirm the hypothesis for this analysis, indicate that clubs with lowest expenditures appear in inferior league positions, since the G3 presented clubs in 100% of the seasons analyzed in the relegation zone, even with spending more money for their football clubs.

In summary, correlation results were able to explain the hypothesis that clubs with highest expenditures achieve the highest league positions because, even without correlations, the results demonstrated that clubs with highest expenditures (in the G1 group and the G2 group) were the ones with the highest positions in the league in all analyzed years.

5. Discussion

The fact that the G1 group presents the highest expenditure group through all the years may be related to superior resources availability, revenues and investors, which may allow signing the best players and keeping the best structure needed to work, which might be something that increases the chances for success. On this line, the Premier League appears as an example that illustrates well this higher likelihood of success. From 2002 to 2010, the club with the most expensive line-up won the title in 66% of cases and only once, having the most expensive line-up, or the second one, did not guarantee the title (Tomkins, Riley, & Fulcher, 2010). The English football has also shown that success has an important impact on revenues (Dobson & Goddard, 1998; Szymanski & Smith, 1997), with national success being mainly driven by team investments (Kuypers & Szymanski, 1999; Szymanski & Smith, 1997). There is also an influx of private investors into European top clubs (Rohde & Breuer, 2016; Scelles, Helleu, Durand, & Bonnal, 2016), for example, which tend to have superior resources and are gaining importance in order to stay competitive in elite football (Kuper, 1999).

The G2 group presents a similar dynamics of expenditure of football clubs as the G1 group. This might occur with the intention of keeping the respective clubs in the highest league positions, as it happens with the G1 group. The G2 group faces troubles because of the competence of the G1 group, which is able to make bigger investments, also paying higher salaries to the best players. On this line, it is claimed that the investment in salaries explains more than 90% of the position variance in a football league (Kuper & Szymanski, 2014); in the Premier League, the likelihood is also considered to be 81% (Anderson & Sally, 2013). Dietl, Franck & Lang (2008) determine that clubs compete by investments and the competitive interaction among clubs leads to an overinvestment scenario, what results in a dissipation of overall league revenues. Moreover, the top 30 elite football clubs in Europe (most originating from English, Italian, Spanish, German and French Leagues, ranked by revenues) has won 90% of the national league titles in those leagues from 2004 to 2013 and 88% were half finalists in the UEFA Champions League during the same period (Rohde & Breuer, 2016). According to the same authors, the last non-top 30 club to win the Champions League was FC Porto in 2004, and Villarreal in 2006 was the last non-top 30 club to achieve the semi-finals, which corroborates our results about the competence that the G2 groups has in comparison with the G1 group.

It is understood that the increase in the G3 group investments is in line with those of the G2 group increase, but it is also considered that the G3 group cannot invest much when compared to the other groups that may earn more revenues. There are not many financial resources, which can help to understand the expenditure oscillation in 2013 and 2014, besides the possible unfair competition in games and also in the economical aspect, with the G3 group not being able to collect and invest in the same level in which groups G1 and G2 do, having to adapt themselves to survive in the first division. On this line, even though expenditures do not present so dangerous a scenario, some teams, like Wigan, are remembered for surviving in those difficult conditions. This team managed to survive in the Premier League even with a relegation likelihood of 95% and wages 4 times lower than the Manchester United (Anderson & Sally, 2013). However, the literature also highlights that revenues can present a significant impact on teams performance. According to Rohde & Breuer (2016), the top 30 European revenue-generating football clubs have grown, on average, by 6% per year, while the top 15 clubs have grown by 7.9% per year, the top ten clubs have grown by 9.5% per year and the top five clubs have grown by 11.7% per year, demonstrating a big difference from the bottom 15

clubs (4.3% per year), bottom ten clubs (4% per year) and bottom five clubs (3.8% per year), which also corroborates our results.

Comparing the football club expenditures with the league position, the fact that the G1 had, in majority, its teams in the "Elite" and "Continental Competition" categories may be related to the increase in the football club expenditures and, accordingly, to better conditions for investment, allowing the clubs to bring the best players, offering higher salaries and enjoying a high quality level to achieve high objectives, such as titles and classification in continental competitions. Those clubs can use strategies to accumulate financial resources, which may be based on owning a global brand powerful enough to generate revenues from merchandising, ticketing and broadcasting (Gladden & Milne, 1999; Pawlowski & Anders, 2012) and the "sugar daddies", attracting financial resources from private majority investors (Franck, 2010; Kuper, 1999), motivating investments into the teams (Rohde & Breuer, 2016).

The presence of the G2 group teams, in high frequency, in the "Continental Competition" category, might be related with the G1 group's financial power, which allows them to get the best quality in the market and apply it on their teams, having better conditions to win more matches than the G2 group teams, which can make some good investments, but not in the same proportion as the G1 group teams do. However, even with different levels of investments, the G2 group could also reach the "Elite" category, which shows that, even in a different reality than that of the G1 group, with lower expenditures but with similar football club dynamics of expenditure, the G2 group, with the right movements in the football club can anjoy good seasons and overcome the competition. On this line and over a long period, teams that win in majority are the ones that pay highest salaries and sign the best players in the market, but surprises might arise, as Porto (a Portuguese team) winning the Champions League in 2004 and Real Sociedad being close to win the Spanish league in 2003 (Soriano, 2013). Football movements, such as passing rate, shots, tackles and intercepts have already been measured to assess performance in this sport (Rampinini, Impellizzeri, Castagna, Coutts, & Wisløff, 2009), since football is also seen as indeed characteristic of a complex sociotechnical system, with performance aspects not currently measured (e.g., adaptability, communication), with a minimal knowledge (e.g., tempo, regaining possession), or not measured in an appropriate context (e.g. pitch area where important actions occur) (McLean, Salmon, Gorman, Read, & Solomon, 2017).,

The fact that the G3 group, in majority, is in the last two categories (Neutral and Relegation + Série B), may be related to the fact that its teams do not have high resources to invest in their football clubs, which might make the competition with the other groups unfair; the latter are able to invest more and acquire more adequate conditions to compete than the G3 group. Football can be seen as a war, because the ones with thinner chances try to fight harder, while the best teams may consider situations under lower pressure (Kuper & Szymanski, 2014). According to Grossmann (2015), team investments exceed profit-maximizing levels through evolutionarily-stable strategies in the competition among clubs to survive in the elite.

Not having significant differences between groups G1 and G2 might be explained by the fact that those teams are the ones able to make more investments in the Brazilian league, and also by taking into account that groups G1 and G2 presented similar dynamics of expenditure in the football club, which brought some balance to league position results among those teams. Corroborating our results, Rohde & Breuer (2016) bring their study of financial success in elite football clubs in Europe as an example, since the richer clubs are peculiar due to their higher revenues and growth rates, with brands achieving global reach, also dominating performance in national and continental competitions. According to them, national success has a significant impact on revenues too.

However, the differences between groups G1 and G3 and between groups G2 and G3 might be justified in the opposite way. In these cases, there is a big difference in football club investors, resources, expenditure and, consequently, in the level of footballers signed and in the teams' quality in general, which may have serious influences on performance as well as on the league position in the end of the seasons. Financial resources have been demonstrated to be a scarce resource in both amateur and professional football (Gerrard, 2005; Wicker & Breuer, 2011), and the teams financial performance is significantly affected by their ownership status (Gerrard, 2005). Moreover, private majority investors have been argued to have superior incentives to invest in their teams compared to clubs with dispersed ownership or owned by member associations (Franck, 2010).

As already mentioned and following the last two paragraphs, the richest clubs pay the highest salaries aiming to win trophies, also enjoying the preference by the media, since the football growth is closely related to the TV, which uses the sport as a knowledge producer (Kuper & Szymanski, 2014). For the disadvantaged ones, it remains to fight to sustain themselves in the elite, since the difference in money received is high when first and second division are compared. To exemplify it, Anderson & Sally (2013) mention Premier League values: not being relegated to the second division represents a 45 million difference to the clubs.

Conslusion

It can be concluded that teams from all groups increased their football club expenditures in the entire studied period. Groups G1 and G2 presented similar dynamics because they are normally in the highest league table positions and the G3 group demonstrated a light oscillation, which is a fact that might be explained by the fact that it is the group with less resources and that tends to suffer more in the competition with groups G1 and G2.

The G1 group teams remain, in majority, in the "Elite" category. It may be understood by the fact that they have a better ability to collect resources and invest, which in turn makes them able to bring more quality to the squad and fight for big objectives.

The group G2, with similar financial development, was mainly present in the "Continental Competition" category, because of the competition with the richest teams in the G1 group, but it is also remembered that the G2 group presented potential to cause troubles to the G1 group's hegemony, since they could reach the "Elite" category in some of the evaluated years.

The G3 group, as predicted, was positioned, in majority, in the "Neutral" and "Relegation + Série B" categories, possibly because of a lower availability of resources to invest by the football clubs and also because of the competition with the stronger teams in groups G1 and G2.

The significant differences occur among groups because of the expenditures made by football clubs, with groups G1 and G2 appearing in more favorable economic conditions than the G3 group, which needs to fight and adapt itself constantly to remaain in the Brazilian first division.

Lastly, it is suggested to make more studies treating wages estimates and transfer expenditures of the teams in connection with the final season results.

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